FIG.1

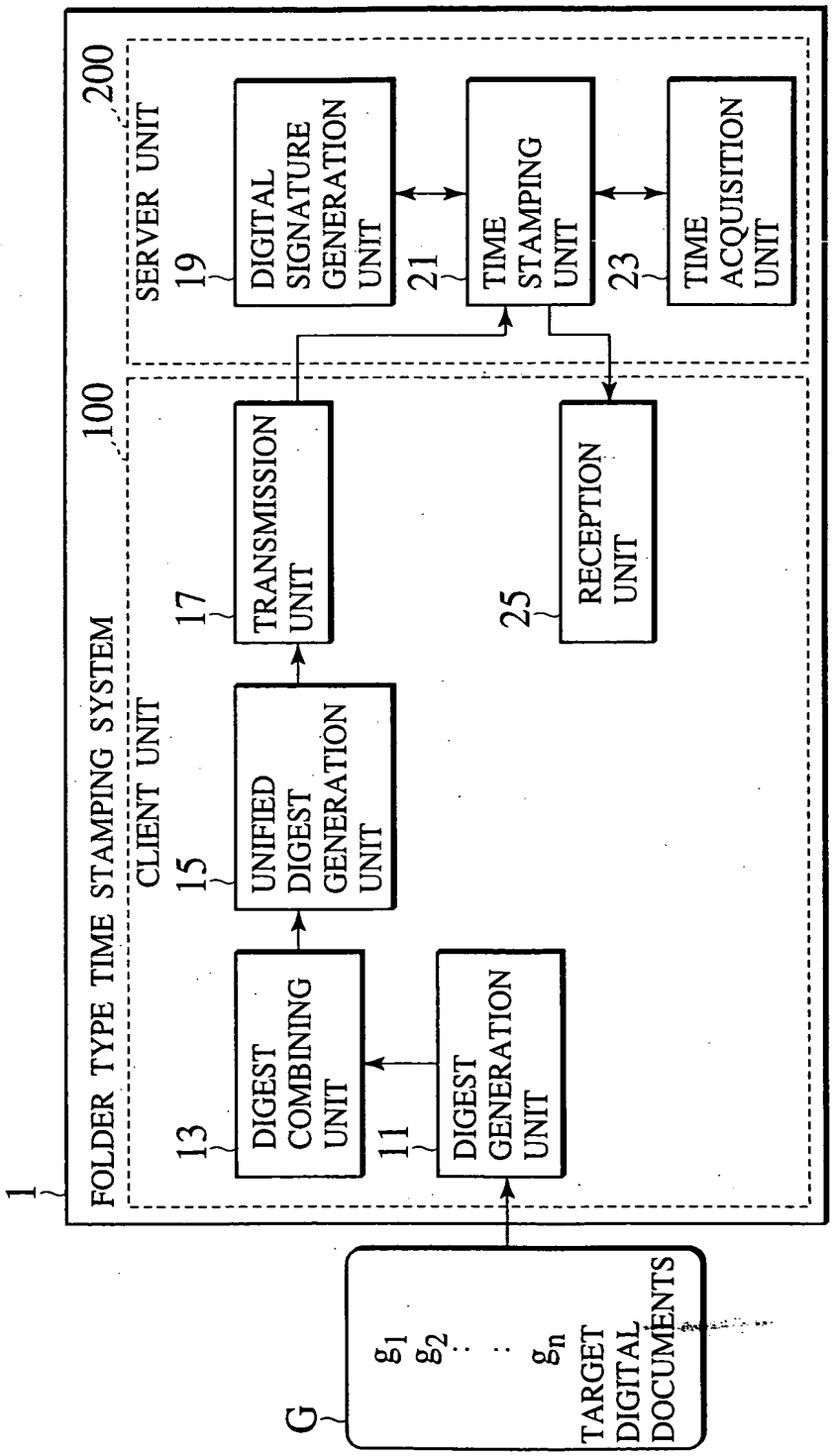

1
FOLDER TYPE TIME STAMPING SYSTEM
100
CLIENT UNIT
200
SERVER UNIT
G
TARGET DIGITAL DOCUMENTS
g_1
g_2
g_n
11
DIGEST GENERATION UNIT
13
DIGEST COMBINING UNIT
15
UNIFIED DIGEST GENERATION UNIT
17
TRANSMISSION UNIT
19
DIGITAL SIGNATURE GENERATION UNIT
21
TIME STAMPING UNIT
23
TIME ACQUISITION UNIT
25
RECEPTION UNIT

FIG.2

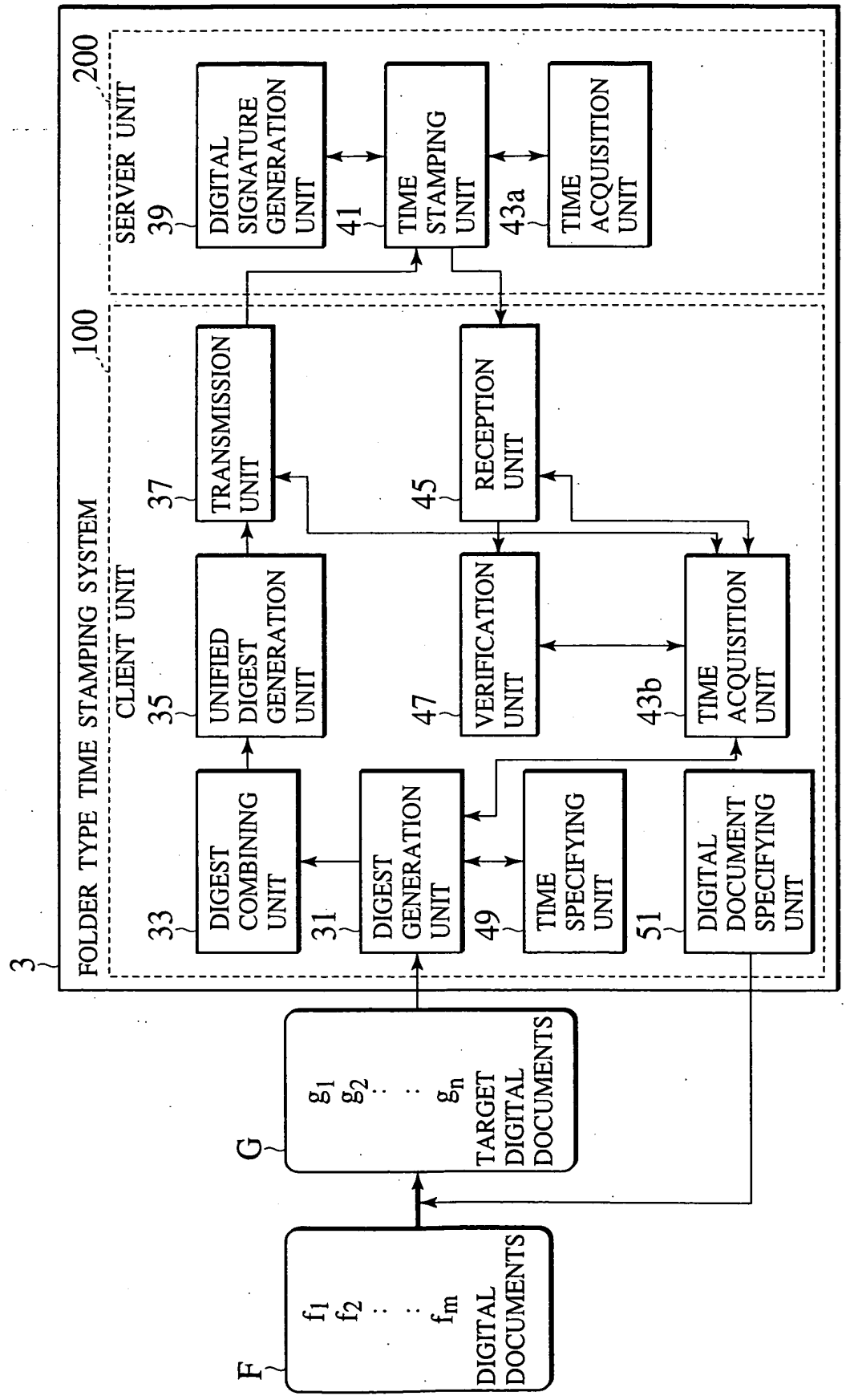

3
FOLDER TYPE TIME STAMPING SYSTEM
100
CLIENT UNIT
200
SERVER UNIT
DIGITAL SIGNATURE GENERATION UNIT
39
TIME STAMPING UNIT
41
TIME ACQUISITION UNIT
43a
TRANSMISSION UNIT
37
RECEPTION UNIT
45
UNIFIED DIGEST GENERATION UNIT
35
VERIFICATION UNIT
47
TIME ACQUISITION UNIT
43b
DIGEST COMBINING UNIT
33
DIGEST GENERATION UNIT
31
TIME SPECIFYING UNIT
49
DIGITAL DOCUMENT SPECIFYING UNIT
51
G
g_1 g_2 : : g_n
TARGET DIGITAL DOCUMENTS
F
f_1 f_2 : : f_m
DIGITAL DOCUMENTS

FIG.3

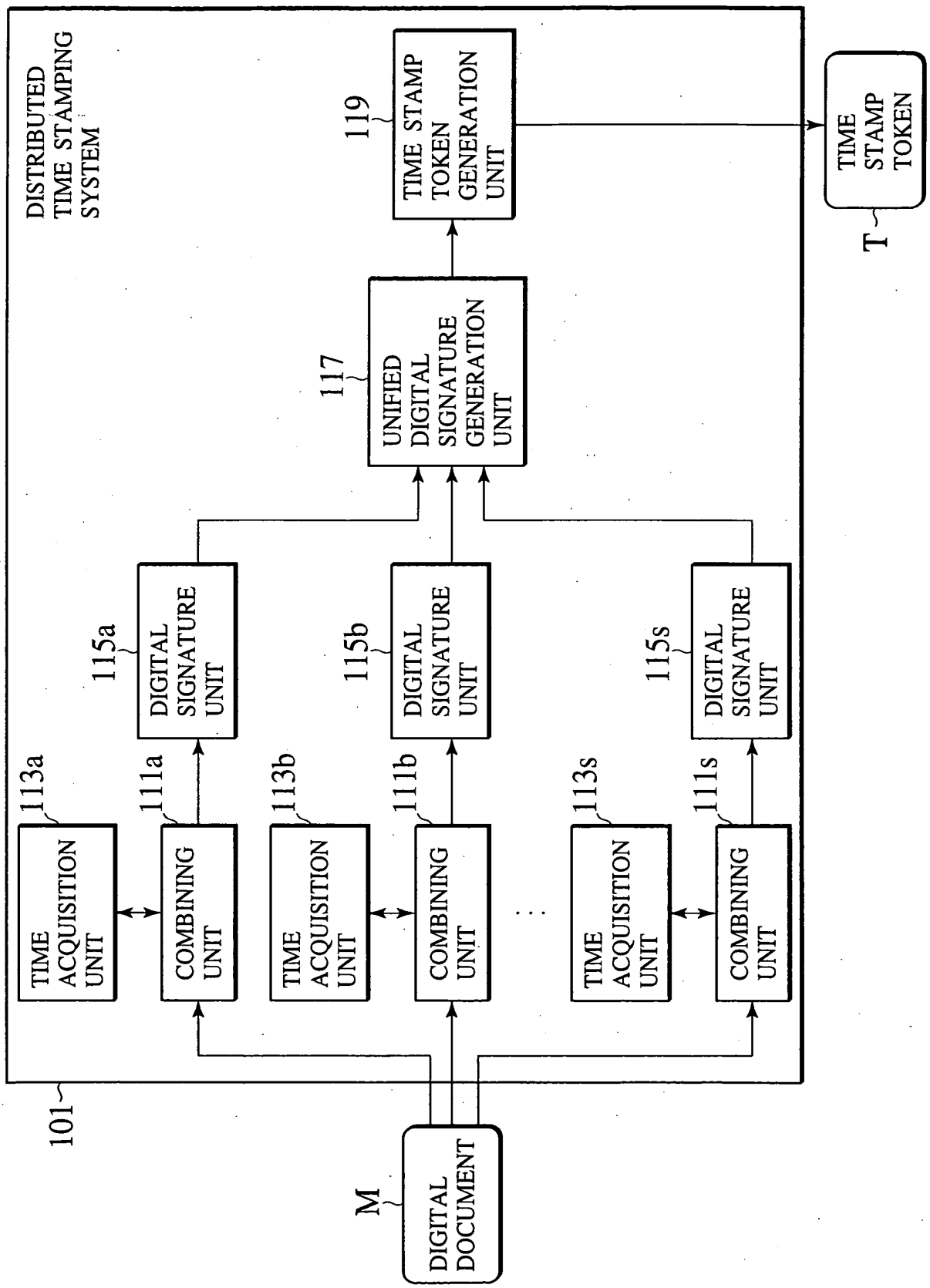

DISTRIBUTED TIME STAMPING SYSTEM
101
DIGITAL DOCUMENT
M
TIME ACQUISITION UNIT
113a
COMBINING UNIT
111a
DIGITAL SIGNATURE UNIT
115a
TIME ACQUISITION UNIT
113b
COMBINING UNIT
111b
DIGITAL SIGNATURE UNIT
115b
TIME ACQUISITION UNIT
113s
COMBINING UNIT
111s
DIGITAL SIGNATURE UNIT
115s
UNIFIED DIGITAL SIGNATURE GENERATION UNIT
117
TIME STAMP TOKEN GENERATION UNIT
119
TIME STAMP TOKEN
T

FIG.4

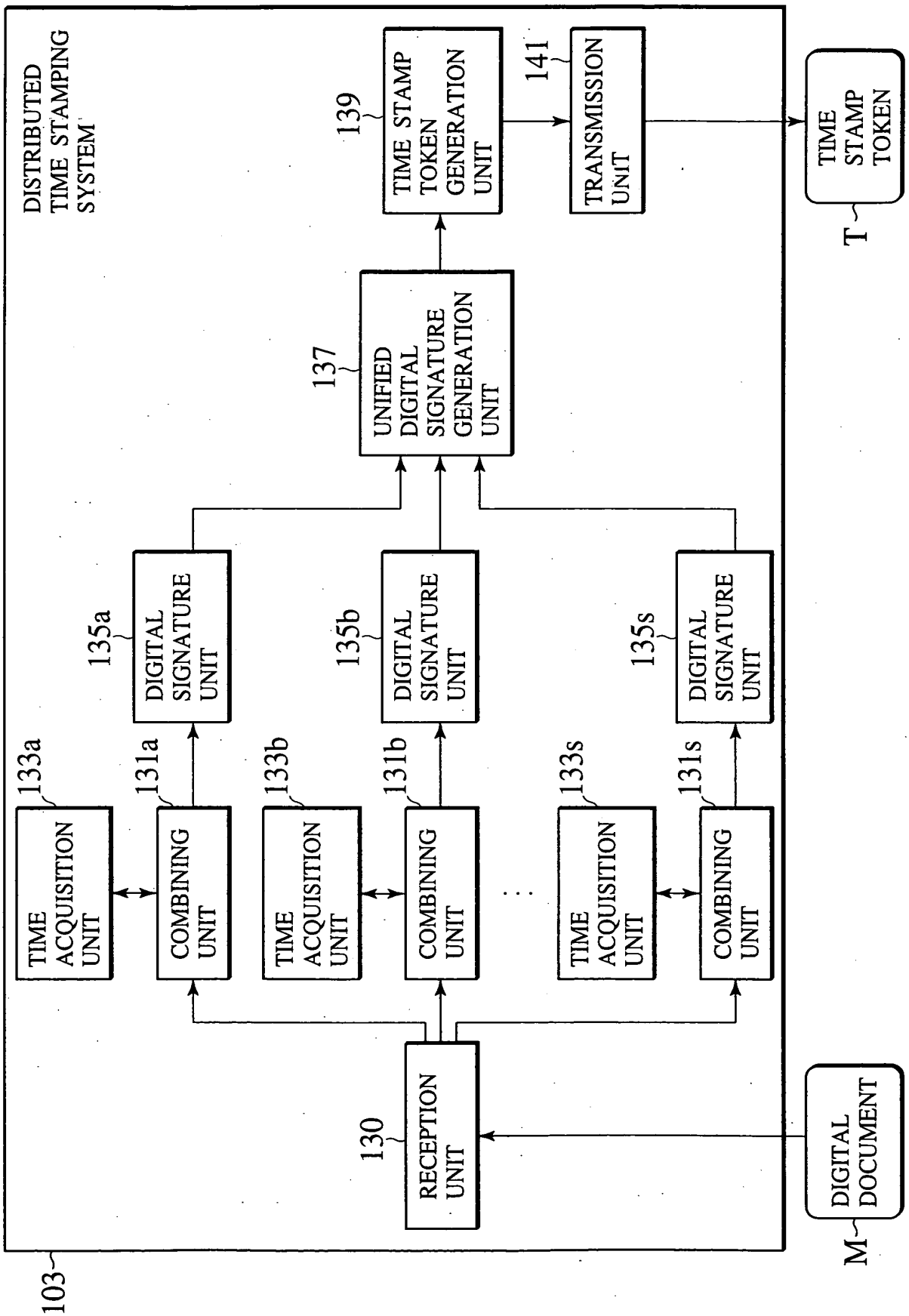

DISTRIBUTED TIME STAMPING SYSTEM
103
M
DIGITAL DOCUMENT
130
RECEPTION UNIT
133a
TIME ACQUISITION UNIT
131a
COMBINING UNIT
133b
TIME ACQUISITION UNIT
131b
COMBINING UNIT
133s
TIME ACQUISITION UNIT
131s
COMBINING UNIT
135a
DIGITAL SIGNATURE UNIT
135b
DIGITAL SIGNATURE UNIT
135s
DIGITAL SIGNATURE UNIT
137
UNIFIED DIGITAL SIGNATURE GENERATION UNIT
139
TIME STAMP TOKEN GENERATION UNIT
141
TRANSMISSION UNIT
T
TIME STAMP TOKEN

FIG.5

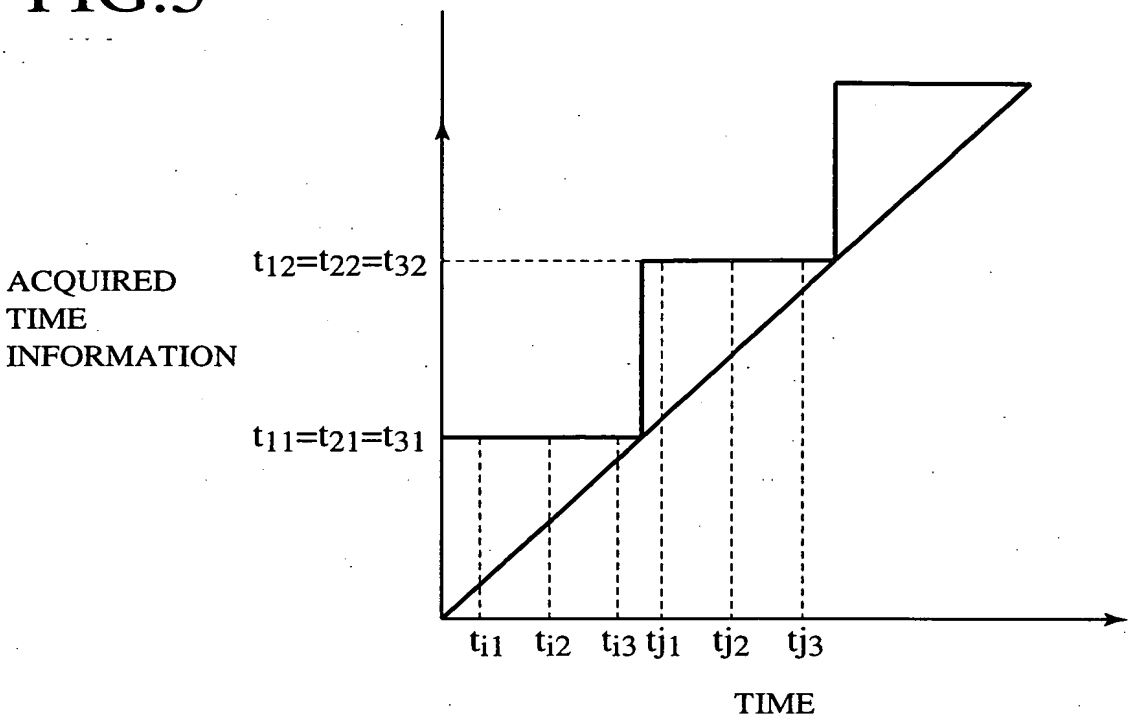

ACQUIRED
TIME
INFORMATION
t12=t22=t32
t11=t21=t31
ti1
ti2
ti3
tj1
tj2
tj3
TIME

FIG.6

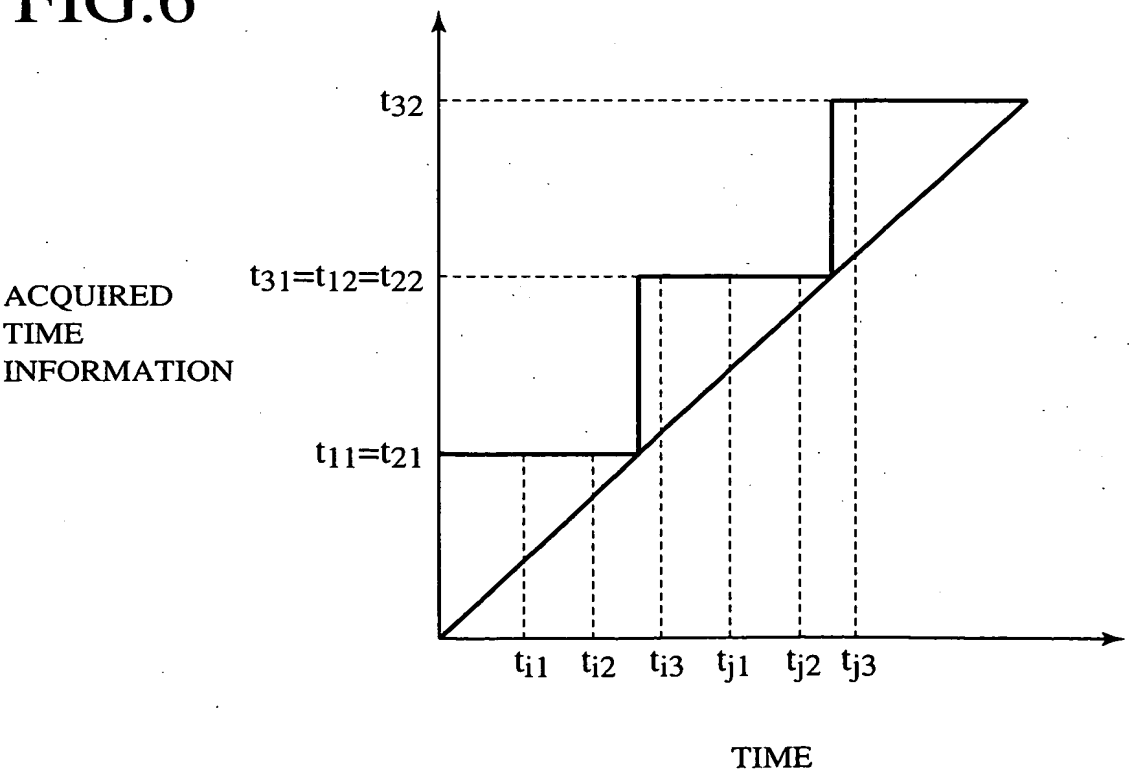
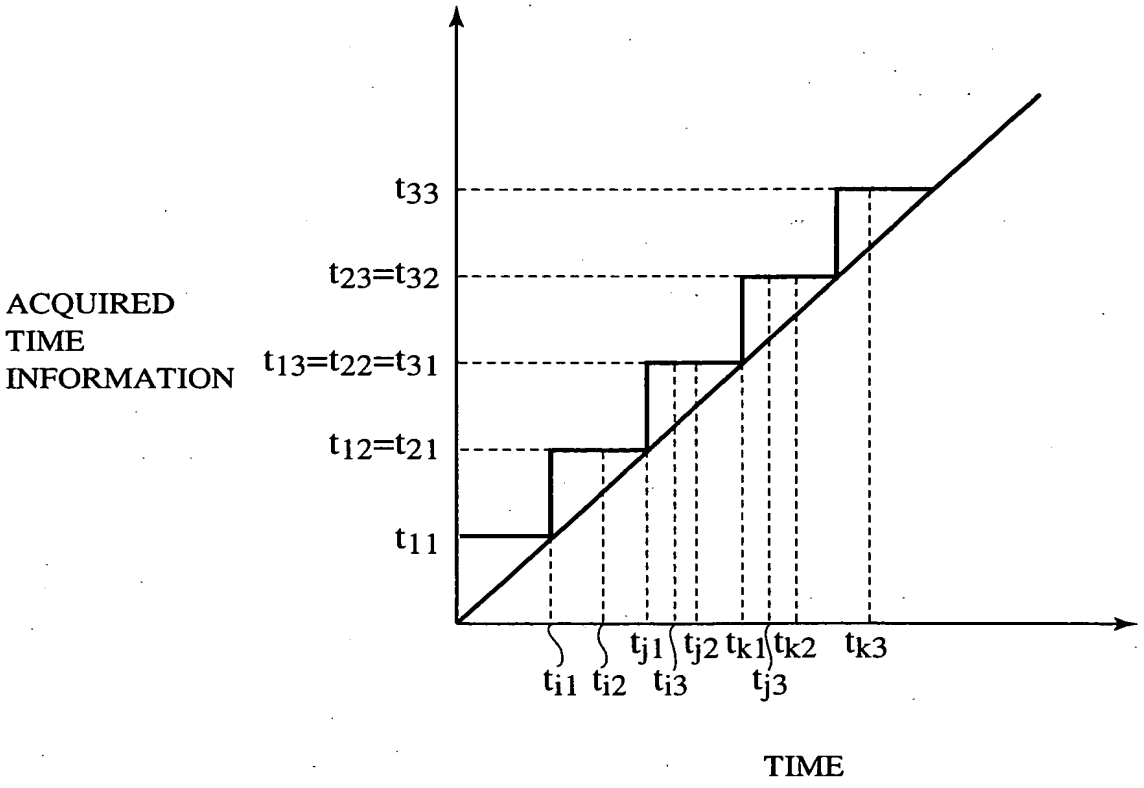

ACQUIRED
TIME
INFORMATION
t32
t31=t12=t22
t11=t21
ti1
ti2
ti3
tj1
tj2
tj3
TIME

FIG.7


ACQUIRED
TIME
INFORMATION
t33
t23=t32
t13=t22=t31
t12=t21
t11
ti1
ti2
tj1
ti3
tj2
tk1
tj3
tk2
tk3
TIME

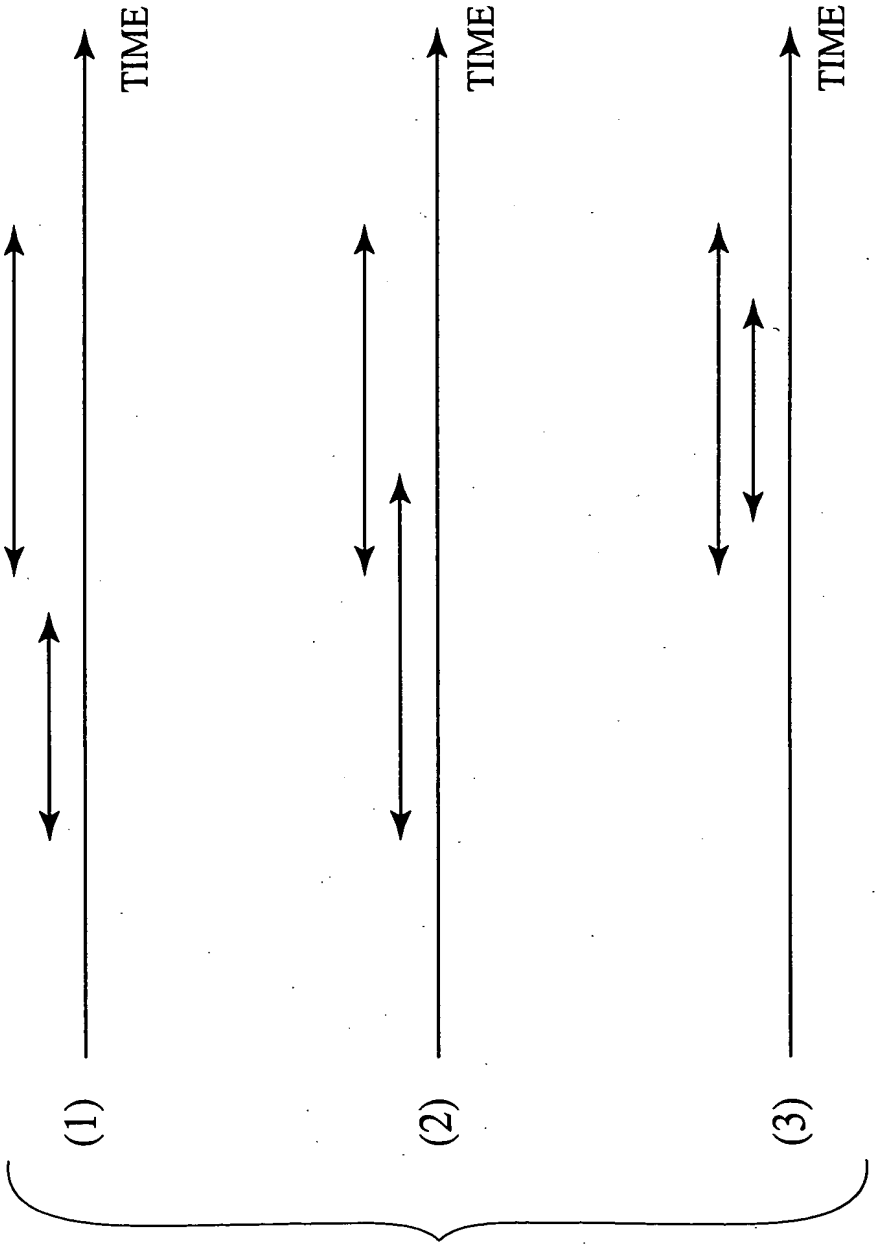


FIG.8

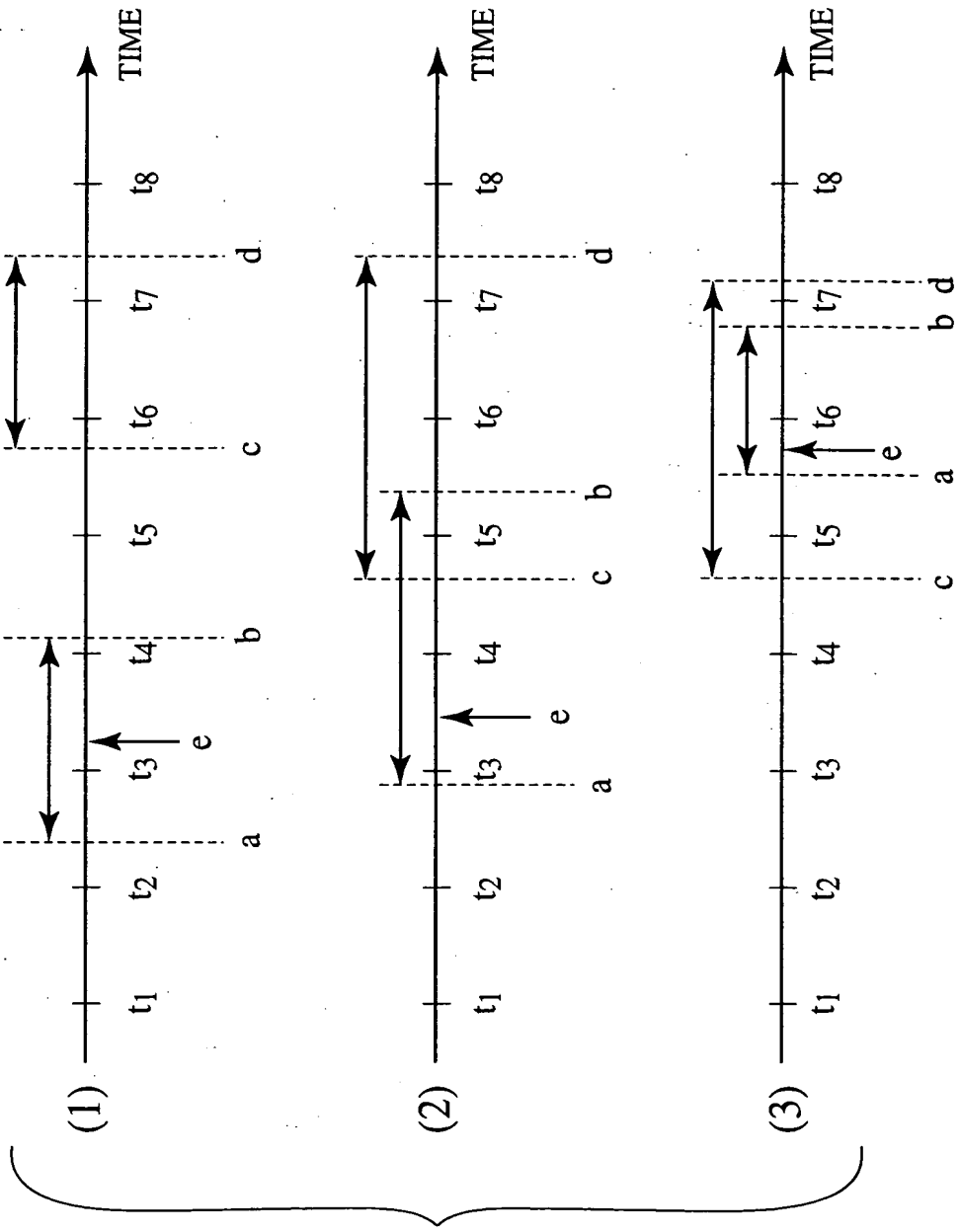


FIG.9

FIG.10

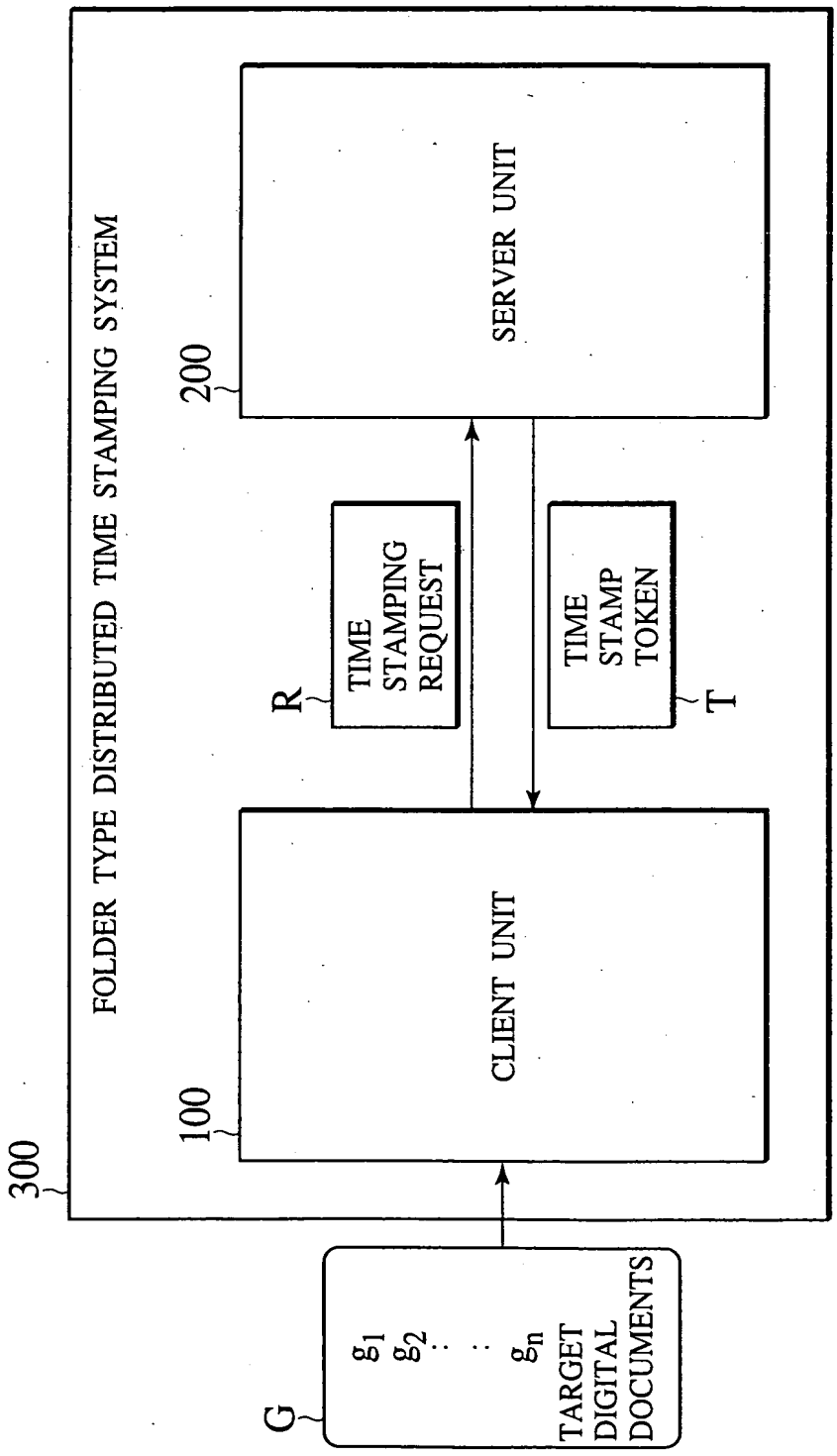

FOLDER TYPE DISTRIBUTED TIME STAMPING SYSTEM
300
CLIENT UNIT
100
SERVER UNIT
200
TIME STAMPING REQUEST
R
TIME STAMP TOKEN
T
TARGET DIGITAL DOCUMENTS
G
g_1
g_2
g_n

FIG.11

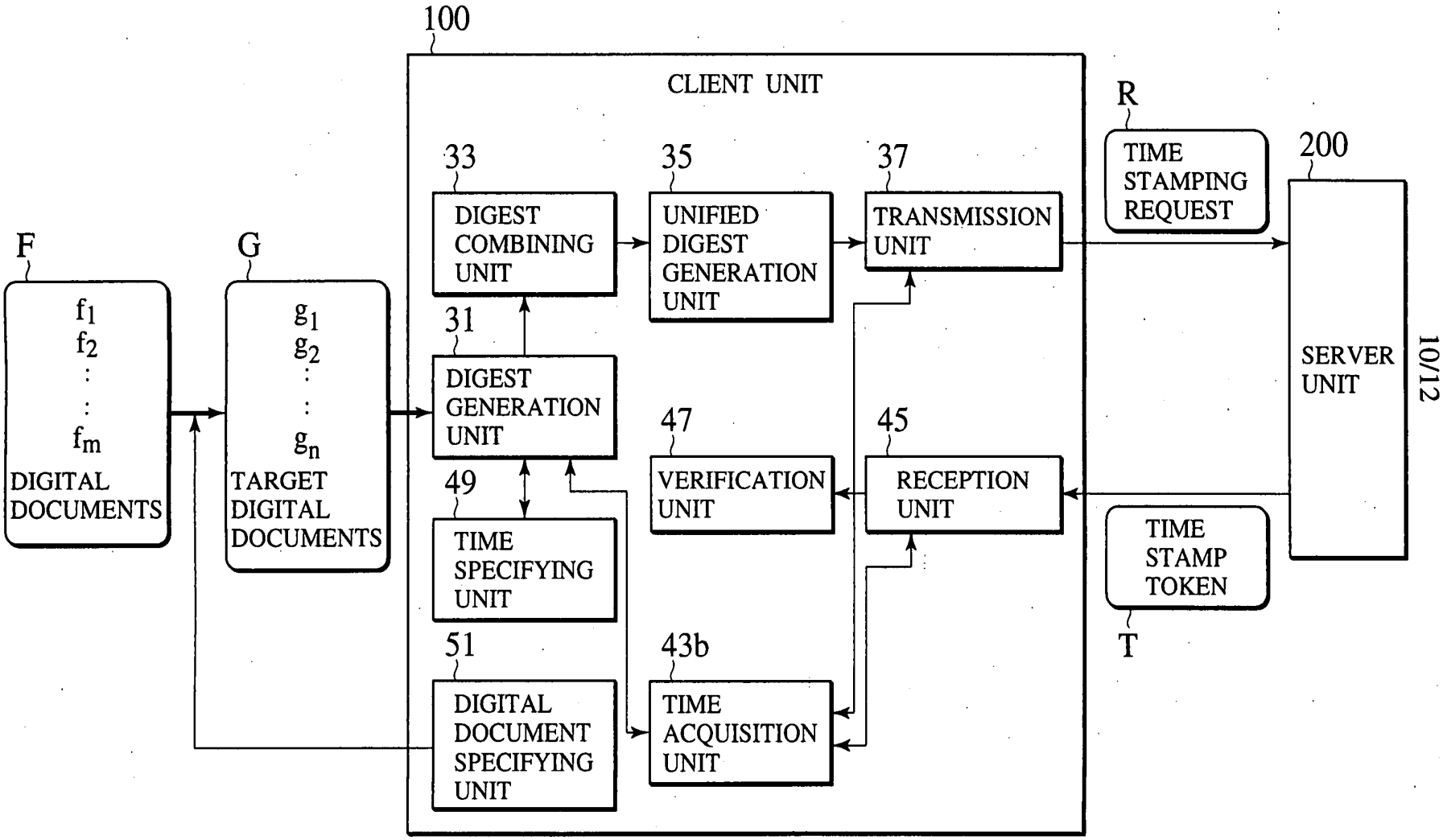

100
CLIENT UNIT
33
DIGEST COMBINING UNIT
35
UNIFIED DIGEST GENERATION UNIT
37
TRANSMISSION UNIT
31
DIGEST GENERATION UNIT
47
VERIFICATION UNIT
45
RECEPTION UNIT
49
TIME SPECIFYING UNIT
51
DIGITAL DOCUMENT SPECIFYING UNIT
43b
TIME ACQUISITION UNIT
F
f_1 f_2 : : f_m
DIGITAL DOCUMENTS
G
g_1 g_2 : : g_n
TARGET DIGITAL DOCUMENTS
R
TIME STAMPING REQUEST
T
TIME STAMP TOKEN
200
SERVER UNIT

FIG.12

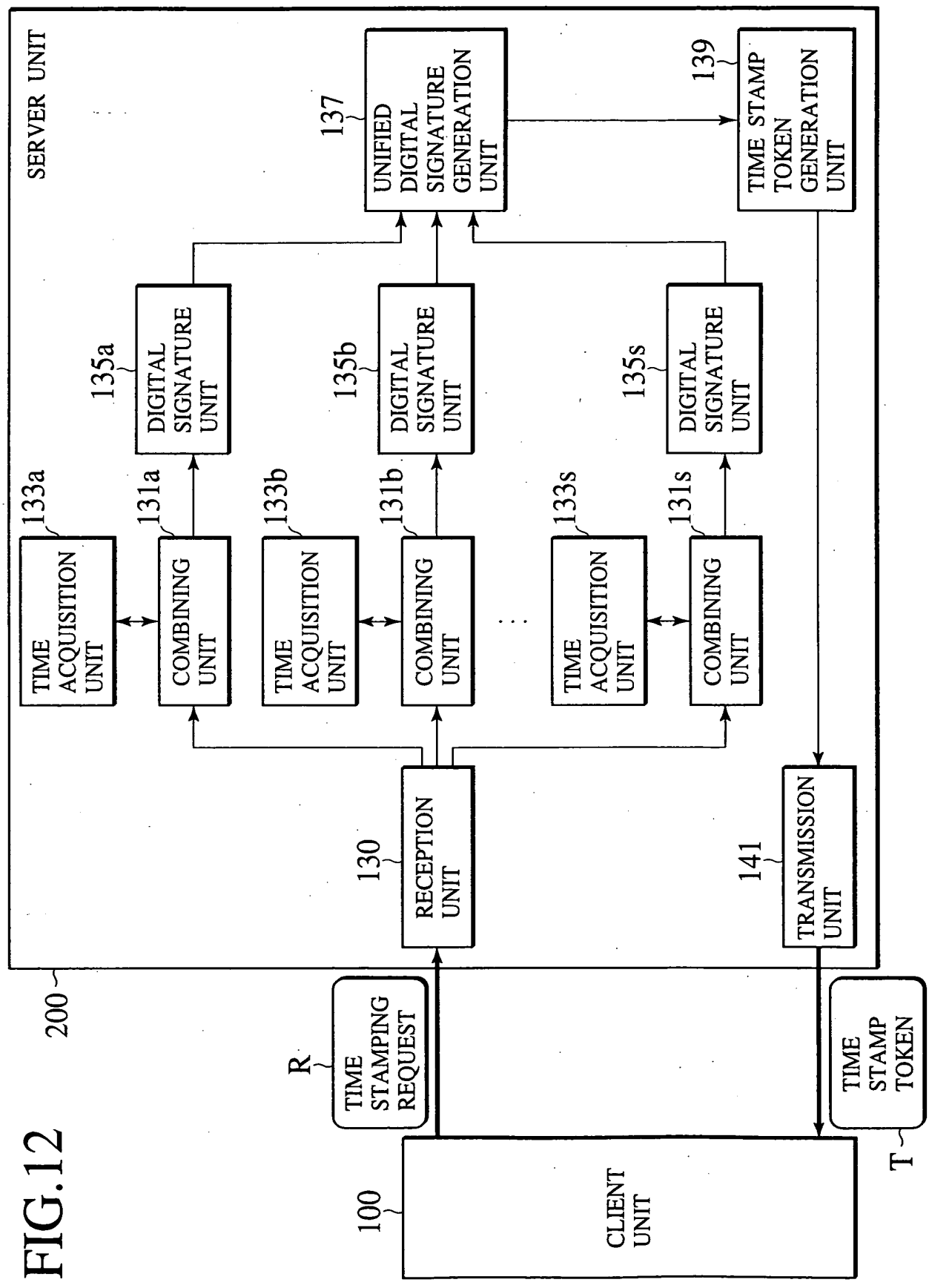
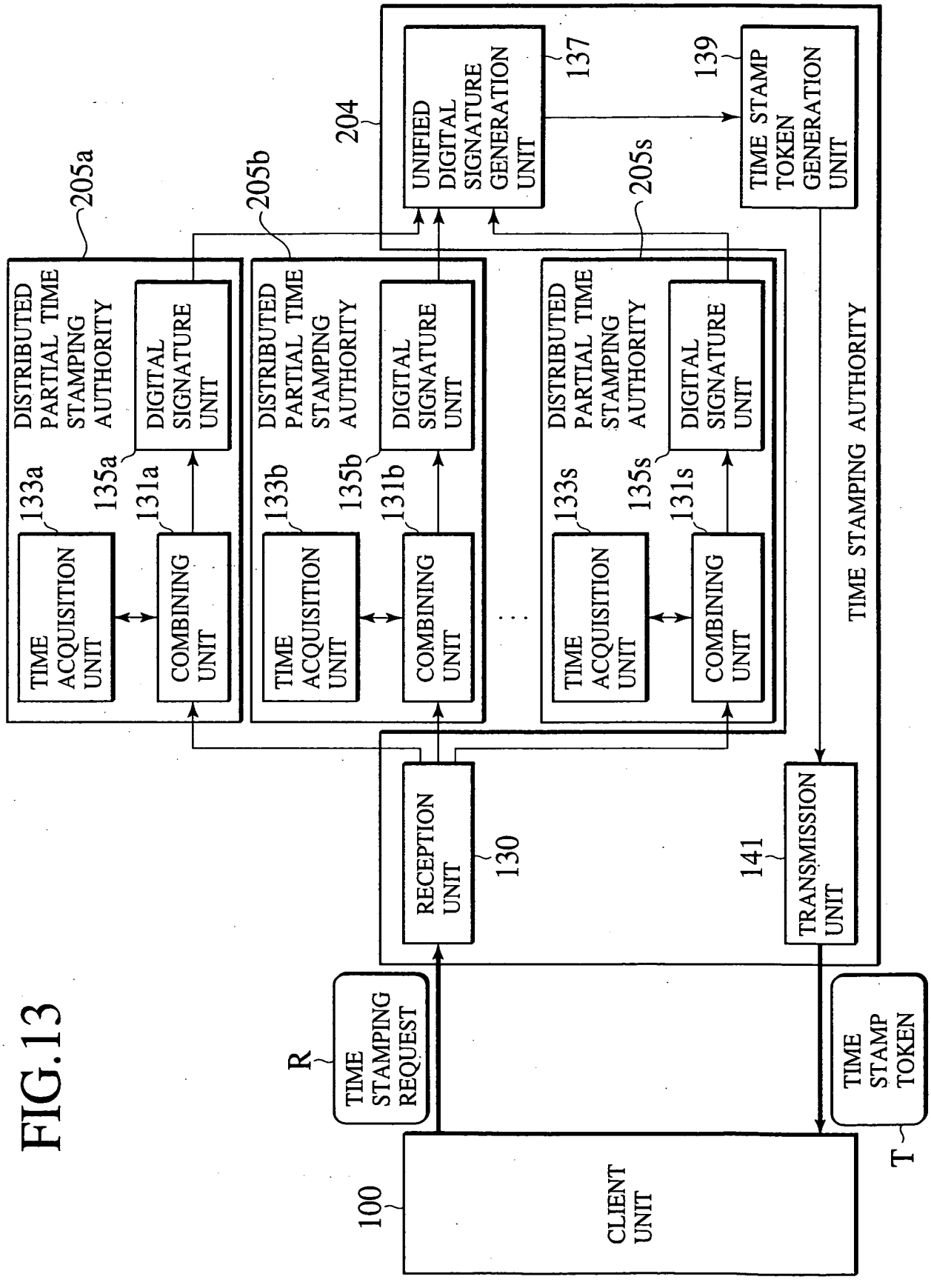

SERVER UNIT
200
CLIENT UNIT
100
TIME STAMPING REQUEST
R
TIME STAMP TOKEN
T
RECEPTION UNIT
130
TRANSMISSION UNIT
141
TIME ACQUISITION UNIT
133a
COMBINING UNIT
131a
DIGITAL SIGNATURE UNIT
135a
TIME ACQUISITION UNIT
133b
COMBINING UNIT
131b
DIGITAL SIGNATURE UNIT
135b
TIME ACQUISITION UNIT
133s
COMBINING UNIT
131s
DIGITAL SIGNATURE UNIT
135s
UNIFIED DIGITAL SIGNATURE GENERATION UNIT
137
TIME STAMP TOKEN GENERATION UNIT
139

FIG.13


100
CLIENT UNIT
R
TIME STAMPING REQUEST
T
TIME STAMP TOKEN
TIME STAMPING AUTHORITY
RECEPTION UNIT
130
TRANSMISSION UNIT
141
204
UNIFIED DIGITAL SIGNATURE GENERATION UNIT
137
TIME STAMP TOKEN GENERATION UNIT
139
205a
205b
205s
DISTRIBUTED PARTIAL TIME STAMPING AUTHORITY
TIME ACQUISITION UNIT
COMBINING UNIT
DIGITAL SIGNATURE UNIT
133a
135a
131a
133b
135b
131b
133s
135s
131s